

# NOTICE OF INTENT

## REQUEST FOR ENTITLEMENT TO PLAN A NEW PROGRAM

Name of the Proposed Degree:	Engineering, BS
Institutional Setting:	Dept. of Industrial & Manufacturing Engineering College of Engineering and Applied Science University of Wisconsin-Milwaukee
CIP Code:	14.0101
Mode of delivery:	Face-to-face, hybrid, on-line
Other Required Approvals:	None.
Institutional Contact Information:	Dev Venugopalan, Associate Vice-Chancellor, UWM

## Description

This Bachelor of Science in Engineering aims to support people who are already working in a technology field and need a bachelor's degree in engineering to enhance their skills and further their career. The curriculum will be more flexible, interdisciplinary, and customizable than the current engineering programs which are more focused on specific engineering disciplines. The program is being designed to facilitate the transfer of Associate in Applied Science students. The Wisconsin Technical College System (WTCS) has 16 campuses with 4,751 graduates with associate degrees in the technology, engineering, and related areas in 2020. (<https://www.wtcsystem.edu/impact/publications/graduate-outcomes-report/>) Ninety-four percent of the graduates from WTCS live and work in Wisconsin. The graduates from these schools are highly skilled and are already practicing their skills in industry. Many of the graduates consider continuing their education to earn a bachelor's degree in order to advance their skills, diversify their careers, or gain promotion and higher income. However, many such students are discouraged from pursuing a bachelor's in engineering degree because traditional engineering programs often require three or more additional years of full-time study along with a large financial burden. Currently no engineering program in the UW System offers a program that allows students with associate degrees in technology to complete a bachelor's degree in engineering with only two years of additional study.

## Outcome of the program

1. Students will have an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. Students will have an ability to apply engineering concepts to produce solutions that meet specified needs with consideration of economic factors
3. Students will have an ability to communicate effectively with a range of audiences

4. Students will have an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. Students will have an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. Students will have an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. Students will have an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

## Program level and contents

The program is a Bachelor of Science in Engineering. The curriculum consists of these: A total of 120 credits are needed for the graduation: (1) 13 credits of math requirements including data analytics, (2) 9 credits of Natural Science (3) 4 credits for modern professional issues and engineering economy, (4) 12 credits from Engineering breadth (selected courses from multiple engineering disciplines), (5) 12 credits for engineering concentration areas, (6) 3 credits of senior capstone design, (7) 15 credits to meet GER Art, Humanities and Social Science distribution requirements, and (8) Free Electives – AAS or other college credits that do not fit in other categories. At this time, the program does not aim for ABET accreditation.

## Resources

The new program uses existing courses and so setting up the new program will not require additional resources, until and unless enrollment increases substantially. New faculty lines will be needed as the program grows, and these lines can serve existing programs as well. To accommodate the need of students, course offerings need to be flexible, possibly including alternating offering of courses in the evening or in asynchronous on-line mode. We anticipate that existing advising resources will prove sufficient.

## Alignment with UWM's Mission

The proposed new program fits well with UWM's "Select Mission Statement" as seen online at <https://www4.uwm.edu/discover/mission.cfm>. In particular, UWM seeks to "develop and maintain high quality undergraduate, graduate and continuing education programs, "further academic and professional opportunities at all levels for women, minority, part-time, and financially or educationally disadvantaged students," "encourage others from institutions in the University of Wisconsin System and from other educational institutions, and "provide educational leadership in meeting future social, cultural, and technological challenges."

## Need for Program

The need for the portability of credits and credentials between UWS and WTCS has been recognized for a long time, and decades of mutual work between and among the two systems and institutions has led to a strong culture of support for transfer and student success among the public colleges and universities of Wisconsin. To facilitate degree achievement of people with AAS degrees, on November 21, 2019, Wisconsin Statutes, § 36.31(2m) (b), the State of Wisconsin 72-Credit Transfer Rule, became law. The statutory requirements went into effect on November 21, 2019. The Universal Credit Transfer Agreement (UCTA) between the University of Wisconsin System (UW System) and Wisconsin Technical College System (WTCS) satisfies the requirement expressed in the statute.

([https://www.wisconsin.edu/transfer/download/UCTA\\_UWS\\_-WTCS\\_17Sep21.pdf](https://www.wisconsin.edu/transfer/download/UCTA_UWS_-WTCS_17Sep21.pdf))

While this law facilitates credit transfer from WTCS to UCTA, it aims at the transfer of the credits at the level of individual courses and for core general education courses. This agreement is primarily about general education; traditionally, technology students do not take many GER distribution courses. This proposed BS program offers students with science and technology background a more holistic degree program allowing them to graduate in two years complementing their prior education, hands-on skills, and current employment.

This program recognizes the need of many individuals to have stackable credentials as they progress through their career. Wisconsin technical colleges offer a dual credit option for high school juniors and seniors to foster a head start of college education and offer technology certificates. The certificates give students job skills to start their career and credits toward an AAS degree if they choose to continue their education. This BS in Engineering is designed for those earning an AAS to continue their education further and recognizes their previous education and experience in a technology field.

Occupational employment projections show a clear need for engineers. The U.S. Department of Labor Occupation Outlook Handbook projects employment in architecture and engineering occupations to grow 6 percent from 2020 to 2030. About 146,000 new jobs are projected to be added. Most of the projected growth in this group is in the engineering occupations, as their services will be in demand in various areas such as rebuilding infrastructure, renewable energy, and robotics.